January 27, 2017

RE: Streamlining Deployment of Small Cell Infrastructure 5G

I am STRONGLY against the expediting of the 5G wireless infrastructure proposed by the FCC. The FCC and the federal government will in effect preempt local government authority concerning new antenna sites (siting) and the implementation of 5G Distributed Antenna System (DAS) technology. Put plainly, the 5G rollout proposed by the FCC is poorly thought out and reckless. The wireless communications industry is equally to blame, as it continues to ignore the adverse impacts of the already vast wireless infrastructure on the general public. The proposed 5G rollout will make the already bad situation even worse. Concerns include but are not limited to cybersecurity, privacy, health / environmental, and the large energy usage / footprint resulting from the wireless infrastructure. All of these concerns exist today but will be further exacerbated by a mindless push to implement 5G.

I have a list of papers and article at the end of this commentary supporting each of the individual claims I have made if the few citations made within the commentary are not sufficient to convince the reader.

Cybersecurity and the Lack of it

5G and the Internet of Things (IofT) provide a million access points for hackers. These access points either have no or very elementary security systems. The industry has made no allowance for this and in many cases cybersecurity is not even on their radar screen. There are countless article and papers addressing this concern and several have been listed at the end of this commentary. The most representative is the article by Larry Greenemeier that appeared in the Scientific American October 26, 2016 issue and appears below.

https://www.scientificamerican.com/article/iot-growing-faster-than-the-ability-to-defend-it/

Personal Privacy and the End of it

Personal privacy is at risk not just from hacking but from the granular data supplied by most of the IoT devices which can be exploited by third parties. For example, an insurance company may have a vested interest in one's blood sugar readings or heart rate/rhythm, and blood pressure to decide the cost of a health insurance policy. Food choices, exercise habits, spending habits and much of one's lifestyle can be accessed due to the interconnectivity of IoT and sold to marketers without consent or knowledge of the consumer. This amounts to warrantless electronic surveillance which is illegal. Electronic information has already been used to break alibis in criminal court cases. It can be misused and or misinterpreted to falsely convict the innocent. Most agree that privacy is generally deteriorating in our electronic society; the planned 5G roll out will logarithmically accelerate this alarming trend. Consider the following expert commentary and the below links to see just how invasive IoT can be.

“Privacy advocates have known about the potential for government to exploit the internet of things for years. Law enforcement agencies have taken notice too, increasingly serving court orders on companies for data they keep that citizens might not even know they are transmitting. Police have already been asking the Google-owned company, Dropcam ,for footage from cameras inside people’s homes meant to keep an eye on their kids. Fitbit data has already been used in court against defendants multiple times.”

https://www.theguardian.com/commentisfree/2016/feb/09/internet-of-things-smart-devices-spying-surveillance-us-government

Threats to Health and Environment

One wonders if the Telecommunications Industry knew full well the radiation emitted by this technology posed threats to human and environmental health when they signed the 1996 Telecommunications Act -behind closed doors and away from public comment. This act, signed by then President Clinton, effectively bars state and local governments from denying cell phone antennae tower placement on environmental or health grounds. 5G with its small cells and DAS must be distributed even more densely, i.e. many more locations than existing cell phone towers, to function effectively. This means deploying massive numbers DAS Nodes on every available location - light stanchions, utility poles, building walls and rooftops, and other small structures either on PRIVATE PROPERTY or in public rights of way. This also translates into a massive increase in electromagnetic radiation (EMR) density for the public and environment already suffering from preexisting radiation courtesy of cell phone towers already in operation. Pity the poor homeowner who is sensitive to the microwave radiation spewed out by DAS Nodes that is unlucky enough to have one placed on his own home. He would be made ill and have no say about his own property being hijacked to serve the 5G roll out. Section 704 of the 1996 Telecommunications Act paves the way for this reality.

"…provides that state and local governments may not deny wireless facilities siting applications “on the basis of the environmental effects of radio frequency emissions,” a matter over which the Commission has exclusive jurisdiction.[36]"(Page 6 of Public Notice)

The science is robust and growing with regard to the health and environmental threats posed by EMR generated by wireless devices. Independent science consistently demonstrates that the current constant exposure to EMR due to the proliferation of wireless technology is destroying our genetic makeup.

The vast body of research on the health effects of radiofrequency microwave radiation has been conducted primarily on lower frequencies, such as those currently used for cell phones and WiFi. The higher frequencies remain largely unstudied, and research science is not keeping up with the FCC’s race to 5G. What ***is*** known, however, is that whereas the lower frequencies travel through our bodies, the higher, frequencies, do not. We can expect with 5G frequencies that the outer layer of bodies will be affected – i.e. skin, eyes, and testes Unlike other countries, such as New

Zealand and India, which are currently studying these new frequencies, our FCC prefers to bypass this "long and arduous task" in order to be "first out the gate."
Support for these claims can be found in the below links

http://www.saferemr.com/2016/08/is-5g-cellular-technology-harmful-to.html

http://thz.caltech.edu/siegelpapers/IET_Dec2010.pdf

https://www.emfscientist.org/images/docs/International-EMF-Scientist-Appeal-2016.pdf

Huge Digital Footprint of Wireless Technologies

Wireless, contrary to a commonly held belief, is not green and requires a huge amount of energy to operate. It uses so much in fact that sustainability is in question. 3G technologies use about 15 times more energy than wired connections, and 4G technologies consume 23 times more energy. There is no data yet on 5G. If the bulk of our Information Communications Technology (ICT) infrastructure and transmissions were wired, such as Fiber to the Home (FTTH), the energy footprint from our "digital world" could be significantly reduced. But because the IoE will greatly grow our dependence on wireless technologies, and because wireless consumes far more energy than wired alternatives, we are now facing an unprecedented and exponential growth in energy consumption. Don't look to the energy efficiency of IoT devices to help with energy consumption as it is more than offset by increased usage.

There are four ways the IoT consumes energy:

1. Data centers

In an IoE world, data collected from billions of machines, "things," and devices, as well as from sensors integrated into our environment, will be stored and responded to in data centers. The 2014 paper, *Data Center Efficiency Assessment* by the National Resources Defense Council (NRDC), reports

"Data center electricity consumption is projected to increase to roughly 140 billion kilowatt-hours annually by 2020, the equivalent output of 50 power plants, costing the American businesses $13 billion annually in electricity bills and emitting nearly 100million metric tons of carbon pollution per year." These figures do not include the 5G IoT energy consumption as this has yet to be calculated.

2. Energy consumed by machine to machine (m2m) communication

Machine-to-machine communication refers to 1) transmission of data from all Internet connected "things," 2) remote software updates for personal devices, and 3) back-up of data, digital photos, and videos to the Cloud.

Hazas et al notes in *Are there limits to growth in data traffic?*,

"This [machine to machine] communication will occur transparently, without observation or interaction, and potentially without limit. At the time of writing, [2015] the existing 6.4bn connected IoT devices is only slightly less than world population (86%), but market predictions suggest this will reach 21bn [billion] devices by 2020— roughly three times world population estimates. Some predictions put machine-to-machine communication as 45% of the whole Internet traffic by 2022."

3. Embodied Energy

Embodied energy, also known as "emergy," refers to energy consumed in the production of goods. This includes the mining, manufacturing, transporting, and delivery of a product.

Digital technology requires far more energy in the manufacturing process than do other products. Kris De Decker explains in *The Monster Footprint of Digital Technology*, that machines, such as cars or refrigerators, use far more energy during their "lifetime" than the amount required to manufacture them. According to De Decker, advanced digital technology has turned this relationship "upside down." As counterintuitive as this may sound, he explains:

"A handful of microchips can have as much embodied energy as a car. And since digital technology has brought about a plethora of new products, and has also infiltrated almost all existing products, this change has vast consequences."

http://www.lowtechmagazine.com/2009/06/embodied-energy-of-digital-technology.html

Our new IoE technology will require billions of sensor nodes, and microchips each of which will have many semiconductors. According to De Decker, the energy needed to produce one semiconductor is, *"up to* ***6 orders of magnitude*** [emphasis added] *above those of conventional manufacturing processes."*

4. Obsolescence of Digital Technologies

Perhaps the largest player in energy consumption of the IoE is that of (planned) obsolescence of all our technologies. Digital technologies generally need to be replaced every 1-3 years as Information and Communication Technologies evolve at an exceedingly fast pace. The fact that our digital devices have such a short lifespan exacerbates the problem of the excessive amount of energy used in their production.

Conclusion:

In conclusion, it should be obvious that the FCC request to streamline the siting procedures to rapidly roll out 5G is a "full speed ahead, deal with the consequences later" strategy. Little or no thought has been given to cyber defense, there is no regard for personal privacy, health impacts are totally denied, and sustainability of the ever growing energy demand of IoT is never addressed. Ultimately this strategy is designed to benefit the wireless industry at the expense of the public.

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